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Traumatic Brain Injury: Consequences and Family Needs

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1. Introduction

Traumatic Brain Injury (TBI) is one of the most common injuries resulting from external causes and constitutes a global public health problem of great significance. TBI is mainly caused by traffic accidents, violence and falls, with a strong impact on the population's morbidity and mortality.

TBI is a complex injury caused by a cascade of changes in the brain and throughout the body. Its consequences, especially neuropsychiatric ones, do not appear immediately, a characteristic of a silent epidemic (Hampton, 2011).

It is considered to be a chronic disease process, according to the World Health Organization, presenting one or more of the following characteristics: permanent, caused by non-reversible pathological alterations, requires special treatment to rehabilitate the patient, or a long period of observation, supervision and care (Masel & DeWitt, 2010).

It affects people of all ages, with a higher incidence among those who are 15 to 24 years old and 75 years old or older. It occurs twice as frequently in men as in women, half of all cases are associated with alcohol and can result in physical, cognitive, and psychosocial disability. Due to the large number of cases with disabilities, prevention is of great importance (National Institutes Health [NIH], 1999).

There is a worldwide concern to promote widespread awareness, warning people of all classes and ages about how serious a problem TBI is becoming. Good education, knowledge of risk factors and prevention reduces the incidence of trauma and its consequences.

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Each year, more than one million people are affected by TBI in the United States. Of these 52,000 die and 800,000 have permanent disabilities at a cost exceeding US\$ 40 billion (Torpy, 2003). A study conducted with 8,927 patients in 46 countries found that one-quarter died within six months after the occurrence of TBI (Silva et al., 2009).

Estimates of the prevalence of TBI in United States soldiers who were serving in the wars in Afghanistan and Iraq between 2001 and March 2011 revealed more than 200 thousand cases (AAAS, 2011).

Reports of emergency cases due to external causes in Brazilian cities, between 2006 and 2007, show there is a predominance of mixed race males, teenagers and young adults with low educational levels. Pedestrians and passengers were the majority of victims among children and adults, while the driver is prevalent among adolescents and adults. Among children, bicycle accidents predominated. The motorcycle was the main vehicle involved in accidents among adolescents and adults. Among the elderly, automobiles were the most common means of transport (Brasil, 2009).

For many years, the literature about TBI has remained focused on victims of trauma, however, in recent decades, studies have also sought to portray the impact of TBI and the need to support the family system that also suffers the consequences of trauma (NIH, 1999; Serio et al., 1997).

Due to the importance of this issue, we decided to describe TBI considerations and discuss the consequences and needs of the family who experiences TBI in order to encourage further studies in the field with a consequent improvement in quality of care.

2. Traumatic Brain Injury (TBI)

2.1 Concept

TBI is defined as any anatomic lesion or functional impairment alone or in combination with the following elements in the head: scalp, cranial bones, meninges, brain or cranial nerves produced by a force of external action (Mariani & Paranhos, 2009).

2.2 Classification

TBI is classified according to its intensity, as severe, moderate and mild, and measured by various parameters such as duration of unconsciousness, the time of post-traumatic amnesia and the scores obtained in the initial Glasgow Coma Scale (Souza, 2003).

TBI can be caused by the penetration of a projectile or other sharp instrument through the skull or from blunt trauma due to an impact of the head on a hard surface or by the displacement of the brain within the skull, which is present in the mechanism of acceleration and deceleration trauma (Sousa, 2006).

Injuries resulting from these types of trauma can be categorized as primary and secondary. The primary type occurs at the time of the event and is related to the mechanism of injury and is classified according to the nature of the injury, either as diffuse (concussion and diffuse axonal injury) or localized (abrasion, contusion, laceration, skull fractures and hematoma). Secondary injuries follow primary ones. In this case, there is decreased cerebral blood flow and metabolic changes that result in ischemia, caused by hypoxia, hypercarbia, hypotension and intracranial hypertension (Sousa, 2006).

2.3 Severity

The indices of trauma severity aid the classification of pre- and intra-hospital risk, predict consequences of trauma, provide support for the provision of resources, allow comparison

among therapeutic methods, improve the quality of care, aid in the development of programs for accident prevention and for the development of safety equipment, facilitate communication concerning the nature and severity of trauma, and help estimate the costs of care (Sousa, 2009).

Severity indices can be based on anatomical data, which consider the site of injury on the body, the injury type and extent in order to calculate the trauma score, such as the Abbreviated Injury Scale (AIS) and the Injury Severity Score (ISS). Severity of physiological trauma indices can be used as well. These evaluate organic response, measured mainly by means of vital signs and level of consciousness, such as the Glasgow Coma Scale and Revised Trauma Score (RTS) and mixed, which use combined measures, such as the Trauma and Injury Severity Score (TRISS) (Sousa, 2009). A study conducted with 18,002 patients indicates the AIS is a good predictor of the severity of multiple trauma injuries (Grote et al., 2011).

Change of consciousness measured by the Glasgow Coma Scale, a widely accepted instrument, assesses the level of consciousness through eye opening, best verbal response and best motor response, with scores ranging from 3 to 15. A score up to 8 has been viewed as an important indicator of severe TBI, between 9 and 12 indicates moderate trauma, and a score equal to or greater than 13, indicates mild trauma (Sousa, 2006).

The duration of posttraumatic amnesia, which includes the period after TBI in which the victim cannot remember events, is another parameter used to establish the severity of TBI. Memory changes are common after TBI, particularly in temporal lobe lesions, frontal, bilateral hippocampal lesions and diffuse axonal injury. Orientation levels such as time, place and person are assessed through the Galveston Orientation and Amnesia Test (Sousa, 2006).

2.4 Consequences

As previously described, a primary lesion corresponds to direct trauma in the brain associated with vascular lesions, whereas a secondary injury refers to ongoing pathophysiological processes that are triggered by primary injuries and extends for hours, days or weeks. Hypotension, hypoxia, edema and intracranial hypertension (ICH) are common examples of secondary lesions considered to be "enemies" of the brain (Hora & Aguiar, 2010; National Association of Emergency Medical Technicians [NAEMT], 2007).

ICH is the most common intracranial lesion that is secondary in the first week of patient care in hospitalized patients with severe TBI and hemorrhagic stroke (Hora & Aguiar, 2010).

Intracranial Pressure (ICP) is defined as pressure inside the skull caused by brain tissue (80%), cerebrospinal fluid (10%) and blood volume (10%). The increase in ICP (Intracranial Hypertension) occurs when the pressure in the skull reaches 20 mmHg or more, resulting from serious conditions, among which TBI stands out (Hora & Aguiar, 2010).

Cerebral edema is the most common cause of increasing ICP occurrences and refers to the abnormal accumulation of fluid in the interstitial or intracellular spaces. Elevations in ICP are serious because of declining Cerebral Perfusion Pressure (CPP) and Cerebral Blood Flow (CBF), which consequently leads to focal or local ischemia with lesion blood brain barrier, acidosis, vasodilatation and inflammation (Figure 1). Ischemia is a catastrophic event, because neurons do not tolerate hypoxia and the brain requires 50 to 55 ml of blood for every 100g of brain tissue to maintain a normal metabolic state (Arbour, 2004; Diccini & Koizumi).

The initial ischemia leads to anaerobic metabolism, which is an inefficient way to power the cell, resulting in lactic acidosis. This commonly occurs after a TBI and about 60% of the victims who die due to this injury have evidence of ischemia at necropsy (Sousa, 2006). It is also understood as a syndrome with initial signs and symptoms of headache, vomiting and visual disorders, whose appearance depends on the severity of factors and its etiology, speed of development, location of lesion(s) and degree of intracranial compliance. The treatment for ICH (ICP monitoring, decompressive craniectomy, liquor drainage, osmotic therapy, hyperventilation, barbiturates, among others) is to maintain an adequate perfusion pressure (Hora& Aguiar, 2010). One of the biggest challenges experienced by the health team is to prevent a secondary brain injury that can be more devastating than the original injury (primary). Controlling damage caused by these lesions is the main focus of care provided to severe patients with brain compromise (Jantzen, 2007; Josephson, 2004).

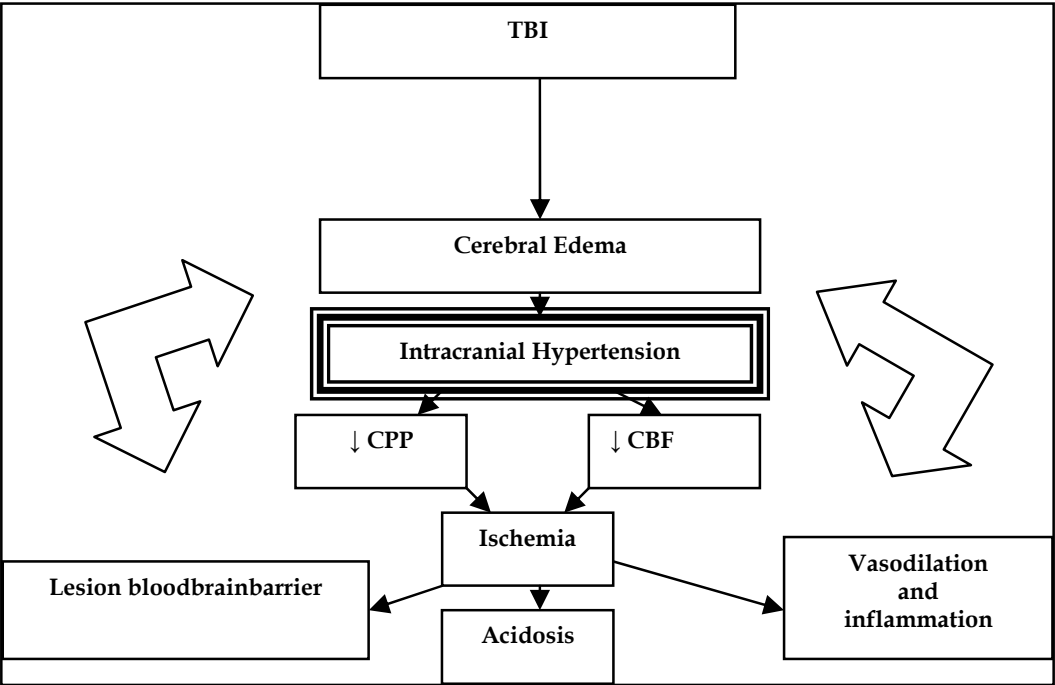


Fig. 1. Schematic representation of TBI during Intracranial Hypertension, 2011.

TBI consequences go beyond the acute phase and may persist for many years. The period up to six months post trauma is when more intense recovery occurs, however, it may take up to one year or more after the trauma. In addition to functional capacity, resuming productivity is an important parameter for analyzing the consequences of TBI (Sousa & Koizumi, 1998; Sousa, 2006). The use of alcohol and drugs increases the risk of TBI and impairs the recovery of an individual who suffers a trauma, in addition to increasing the risk of relapse and dependence (Bjork & Grant, 2009). Patients who survive TBI may present impairments and disabilities that can be temporary or permanent, affecting the individual's ability to perform tasks. The physical and psychological sequelae of TBI patients are dramatic. The neuropsychiatric alterations after a traumatic event are many and diverse and generally include the categories of mood, cognition and behavior disorders, leading many patients to resort to psychiatric evaluation (Nieto et al., 2003).

There are occurrences of neurological disorders after TBI (epilepsy, headaches and sleep disorders), as well as neurodegenerative diseases (decline in cognitive function, Alzheimer's, Parkinson's disease), neuroendocrine disorders (post trauma hypopituitarism), psychiatric disorders (mood disorders, anxiety, depression, compulsive obsessive disorders). There are non-neurological diseases, as well (sexual dysfunction, urinary and bowel incontinence, musculoskeletal dysfunction) and possibly metabolic dysfunction, among other occurrences, that can last for months or years (Masel & DeWitt, 2010).

Post concussion syndrome (PCS) is usually a sequela of TBI and includes headache, dizziness, fatigue, neurocognitive impairment and mood and behavior alterations. Headaches are a key symptom and the most common of PCSs, beginning within seven days after a trauma; it is classified as chronic when it persists for more than three months (Láinez & Pesquera, 2011).

Chronic pain is a common complication of TBI and contributes to morbidity and poor recovery after injury. It is independent of psychological disorders and frequent among mild TBI patients (Nampiarampil, 2008).

Other consequences were also described in a consensus on the rehabilitation of people with TBI: visual and language impairment, nutritional and gastrointestinal disorders, as well as memory, attention and concentration disorders, aggressiveness, agitation, impulsiveness, social disinhibition, personality change, suicide risk, divorce, and unemployment, among others (NIH, 1999).

Gould et al. (2011) found a significant association between psychiatric disorders after 12 months of TBI and unemployment, pain, poor quality of life and the use of ineffective coping strategies.

A meta-analysis showed an increased risk of schizophrenia following TBI of about 60%, with a larger effect in those people with a genetic predisposition to psychosis (Molloy et al., 2011).

Many studies have focused on severe TBI; however, people with moderate and mild TBI also experience sequelae (Kreutzer et al., 1992). Although this is considered the simplest form of TBI, it can be disabling and its effects are minimized with a certain frequency or discredited by the population. Usually patients are discharged from an emergency department without any guidance concerning cognitive changes that affect how a person acts and thinks, such as forgetfulness, poor attention span and concentration, fatigue, sensitivity to light or sound, changed taste and smell (Maia et al., 1993).

A comparative study conducted in an emergency department at one week and at three months after people suffered a trauma revealed that the group of patients with mild TBI complained about memory and concentration in daily activities (Ponsford et al., 2011). The absence of an imaging abnormality (computed tomography or magnetic resonance) is not equivalent to the absence of an abnormality (Bigler, 2001).

The consequences can also remain in the long term, such as shown by a study conducted 12 months to 21 years after mild TBI. The studied patients complained of significant disorders in sleep patterns (Schreiber et al., 2008) as well as severe and persistent neurobehavioral problems following mild TBI (Hartlage et al., 2001).

McDowell (1995) described a protocol with 18 initial choices to deal with the consequences of mild TBI in a non-traditional way, using homeopathic medicines properly licensed by the U.S. Food and Drug Administration.

A study conducted between 1986 and 2008 with 32,133 elderly Dutch patients revealed a marked increase in hospitalization of these elderly individuals due to TBI caused by falls, particularly in the oldest ones; most were diagnosed with a concussion or contusion injury (57.3%) (Hartholt et al., 2011).

American soldiers who are serving in Iraq and Afghanistan have suffered severe head trauma and persistent physical, emotional and behavioral problems, requiring efforts to develop better ways to diagnose and treat the consequences of such injuries. Mild TBI has been the most common in this context, probably caused by explosions that affect the connections of the brain at the level of capillaries with consequent widespread contusion and tissue damage; as such, it is not evident in structural imagery (Hampton, 2011).

There is a high prevalence of soldiers with posttraumatic stress disorder. Many of the patients with TBI develop depression or other mood disorders that limit their social contact with consequent increased loneliness (Hampton, 2011).

People with TBI become more socially isolated, with few friends, and an increasingly denser and smaller social network (Zasler & Kreutzer, 1990).

According to Sluzki (1997) this isolation is caused mainly by the individual's restricted mobility: when one stops working or attending school, church, community activities, among others, this reduces the opportunity to make social contacts. The author also reports that sometimes the disease can generate new networks, as well, such as those corresponding to social services and health care.

Zasler & Kreutzer (1990) studied sexuality after TBI and observed that most cases of sexual difficulties are attributed to emotional and psychological problems, which are characteristic of people with TBI, who typically have difficulty maintaining emotional stability.

A Canadian study carried out with 104 women, five to 12 years after moderate to severe TBI showed that 46% of them experienced amenorrhea with duration of up to 60 months; 68% experienced irregular cycles and reported difficulties in the postpartum. These results indicate there is a need to provide women's health care after injuries (Colantonio et al., 2010).

According to epidemiological assumptions, Souza (2003) states that patients with TBI can be considered within the parameters of people at "risk of damage" and "lower quality of life"; there are changes in all aspects of life for many years (Hawthorne et al., 2008).

Considering the complexity of trauma as a public health problem worldwide, a group of researchers reached a consensus concerning the categories to be used in research addressing TBI in order to improve comparisons among studies, facilitate meta-analysis of data obtained from patients, standardize data essential for systematic reviews, and advance in patient care. The categories identified were designated as: participant / subject characteristics, participant and family history, injury / disease related events, assessments and examinations, treatments / interventions, protocol experience, adverse events and safety data and outcome, and function (Maas et al., 2011).

The preceding discussion indicates that the importance of deepening knowledge concerning TBI is mainly related to the magnitude of its consequences and the need for planning appropriate care. Mello Jorge & Koizumi (2004) suggest investments not only in relation to aspects of primary and secondary prevention, but also tertiary prevention focused on long-term care, rehabilitation and reintegration to minimize the effects of trauma and reduce hospitalizations.

3. Family

3.1 Organization and concept

Changes observed in contemporary society related to economy, work organization, revolution in human reproduction, changes of values, liberalization of habits and customs, all resulted in radical changes in the organization of families (Mioto, 2004).

Among these changes are the downsizing of families, that is, families used to be large with many children and currently, given the scarcity or absence of family resources, families have fewer children or no children at all (Duarte, 2001).

Another change is related to a variety of family arrangements, the nuclear family with a heterosexual couple united by marriage raising biological children, is increasingly less relevant, both in statistical and legal terms, which reveals itself as something more complex than previously thought (Fonseca, 2004).

The result of such changes is the weakening of family ties, making families more vulnerable to life events such as deaths, disease, unemployment, and self-management in everyday life (Mioto, 2004).

Walsh (2005) uses the term "vulnerable families" to designate those who are overwhelmed and unsupported, facing many challenges and unmet needs. He adds that even in the face of all the problems families experience in today's world, one should not view families as "dysfunctional families" but as "families struggling with many problems", often beyond their control. Most of the time, the problems are not caused by them.

Due to the diversity of structures and forms of organization of families, the complexity of the institution becomes evident. As stated by Althoff (1999), the concept of family is dynamic in time and space, depending on the structure and functions of each society, and therefore, it is difficult to find a universal definition.

Angelo (1997) states that in order to clarify the focus of attention of someone when speaking of family, one is required to present a definition of it, because it is precisely the definition of family that will determine the questions about this family and instruments used to achieve the defined dimensions. For the author, such a definition somewhat directs the perspective and intention of working with families.

Angelo & Bousso (2001) conceptualize family as a system or a unit whose members may or may not necessarily be related or live together, be with or without children, not necessarily having a single parent. What shall exist is, therefore, a commitment and bond among its members. For Wright & Leahey (2002) "a family is who its members say they are".

The boundaries of the meaningful system of an individual are not limited to the nuclear or extended family but include the full range of interpersonal bonds of an individual. In particular, this consists of his/her personal social network, which includes family, friends, work relationships, study, community embeddedness and social practices (Sluzki, 1997).

Angelo (1999) points out three challenges that must be overcome to facilitate approaching and working with families. The first is "teaching to think about family" that is, being sensitized to it, which involves understanding and appreciating the complexity of family life. The second is "to encourage advanced practice with families" which is to create strategies and institutional mechanisms to promote sensitization of professionals and provide them tools to deal with families. The last is "to help one to build knowledge concerning family" based on doubts, uncertainties, and willingness of people to overcome their own limits to find the truth.

3.2 Consequences of TBI for the family

In the family, the impact of TBI is felt in many consequences, among which are stress and sadness (Tyerman & Booth, 2001; Watanabe et al., 2000), changes in family roles (Serna & Sousa, 2006; Tyerman & Booth, 2001), guilt and anger (Sander & Kreutzer, 1999), difficulties

in sexual and marital relationships (Tyerman & Booth, 2001), depression (Serna & Sousa, 2005), psychiatric disorders (Livingston et al., 1985), anxiety (Marsh et al. 1998a; Marsh et al., 1998b), psychosomatic disorders (Kreutzer et al., 1992), and reduced quality of life (Kolakowski-Hayner et al., 2001).

One third of caregivers of patients who were one to two years post injury were at risk for depression, anxiety, or other forms of psychological distress. Those who care for survivors who are more disabled, unemployed or otherwise uninvolved in productive activity, or have problems with alcohol abuse, are at greatest risk (Kreutzer et al., 2009).

The use of tranquilizers, sleeping medications and alcohol to cope with trauma was also reported (Kreutzer et al., 1992).

These studies indicate that these negative consequences are mainly caused by behavioral, psychosocial and cognitive changes presented by patients with TBI, and those associated with physical impairment, such as visual and motor deficits (Frosh et al., 1997; Marsh et al. 1998a). Hora & Sousa (2005) reported that the behavioral changes of patients that mostly affected the family were explosive temper, aggressiveness, depression, irritability, anxiety, dependency and forgetfulness.

Rolland (2001) argues that different types of disability imply differences in specific adjustments required by the family. The association of cognitive and motor deficits of a patient requires a greater redistribution of family roles than in the case of motor deficit only. Spouses are more affected than parents by the disease. Common sense suggests that parents should better adjust because they often have a partner to share the care burden (Kreutzer et al., 1992).

Each family member has a different perception of how their lives have been affected and how they will be affected by the patient's trauma. Different perceptions, personalities and coping styles contribute to emotional differences within the family (Sander & Kreutzer, 1999).

Social isolation affecting a patient also affects family members. Sluzki (1997) asserts that there is a positive correlation between a person's social network and health. A chronic illness deteriorates the quality of an individual's social interaction and reduces the size of one's network (the number of people) in the long term and the ability to access it. This negative effect has a negative impact on the individual's health and/or intimate group (especially the family), which in turn increases the shrinkage of the individual's network and so on.

The family with a person with TBI is in crisis, because this event totally changes one's circumstances, ambitions and life in a considerable way (Freeman, 1997). The crisis triggered by a TBI provides families the opportunity to move toward greater cohesion or toward deterioration of its functioning; the quality of education received during such a period is one of the most important factors for its resolution (Gordon, 1989).

There is no doubt that TBI affects not only the person who suffered the trauma, but the family system as well (Cole et al., 2009; Hora & Sousa, 2005; Watanabe et al., 2000). Patients are not the only victims; their families suffer as much, if not more, and can also be considered victims of trauma (Dufor et al., 1992; Fowler, 1997) or occult victims of trauma.

3.3 Family needs

Families experience a lot of needs in the initial period of crisis after a TBI, which may go unnoticed or not be recognized by health professionals. However, because the effects of TBI are often long-term ones, it is important to assess these needs after the initial crisis period, that is, in the long-term (Dufor et al., 1992; Kolakowski-Hayner et al., 2000).

Many studies have only focused on short-term needs after the trauma, but little is known about the post acute phase. Considering the duration of sequelae of TBI, however, addressing the needs years after the trauma is a substantial challenge (Sander & Kreutzer, 1999).

After an extensive search in the literature seeking instruments that measure the needs of families, the Family Needs Questionnaire (FNQ) was chosen in the nursing field to be a reliable and valid instrument to be used in the American culture and which present the specific needs of families of people with TBI. This instrument was translated and adapted for the Brazilian Portuguese language and culture (Hora & Sousa, 2009).

The cross-cultural adaptation is a process that comprises five steps or stages, in which an evaluation of semantic, idiomatic, cultural and conceptual equivalences is performed between the original and translated version in order to achieve content validity for the instrument (Hora & Sousa, 2009).

The FNQ was developed in Virginia, United States by Kreutzer and Marwitz (1989) in an effort to standardize the measures of TBI. The instrument lists various psychosocial and educational needs visible in the acute and post-acute phase of TBI. Clinically, the responses obtained from family members can be used for assessment and intervention. The FNQ, therefore, has the potential to improve understanding of family members (Kreutzer et al., 1994).

Thus the FNQ identifies the need for, importance and degree of care, aids in the development of individualized educational programs tailored to the needs established by family members, as well as group support programs. Priorities can also be established to meet these needs, in addition to serving as an index for the effectiveness of the intervention. Its administration in series can help to identify temporal changes of needs (Kreutzer et al., 1994).

The need for information is prominent in the short and long terms (Kolakowski-Hayner et al., 2001; Serio et al. 1997). According to Kleinpell & Powers (1992) such a need can be considered a universal need, due to the high frequency it is found in many studies.

The information needs of families of people with TBI was the subject of a study conducted by Junquera et al. (1997) who emphasize the importance of providing information concerning the consequences of TBI several years after a trauma, highlighting behavioral and emotional disorders, aiming to better cope with these problems, since these were the most noticed by the family. The study also reveals that the understanding of the effects of TBI improves family health and facilitates more adaptive behaviors.

The Brazilian study performed with family members of people with TBI and which used the FNQ also indicated the need for information as the most important. It also observed that most needs were not met; the least addressed need was related to resources for the patient and family (Serna, 2005).

It is important to keep in mind that information should not be merely transmitted to family members in a didactic manner, but, reflexively, exploring its significant responses (Man, 1999). Information is therefore an important mechanism to prevent family crises and should be consistent and realistic (Kreutzer et al., 1994). A well-informed family member is able to provide a more appropriate therapeutic environment for the patient (Eisner & Kreutzer, 1989). Investigations addressing the identification of family needs correspond to an effort to improve the adaptation of its members to the new condition of having a survivor with TBI (Kolakowski-Hayner et al., 2001).

3.4 Intervention with families

According to Wilkinson (1999) little has been written about the best way to provide such support, which is corroborated by Tyerman & Booth (2001) when they assert that family members often face changes in patients after TBI with little support, especially when there are long-term cognitive and personality changes.

The description of a study carried out in the United Kingdom showed that support for families after TBI starts with an assessment of the family to understand the impact caused by the TBI and, subsequently, conducting educational workshops, family support and individual counseling by a specialist in marital problems, while time for rehabilitation is variable for each family member (Tyerman & Booth, 2001).

The study developed by Acorn (1995) in Canada showed that the identification of family needs precedes the development of a support program. The results revealed the importance of support groups to meet their educational and psychological needs of families.

Regarding the importance of providing support to the family, according to Pelletier & Alfano (2000), when families received greater support, depression diminished.

Family members need to have a safe place to express their feelings and reactions in the face of behaviors they observe and experience, while it is also important that the professionals involved have the ability to listen, offering realistic and individualized advice (Wilkinson, 1999).

According to Silva (2003) resilience represents one of the possible avenues for professionals to work primarily with health, shifting the emphasis from the dimension of the negativity of the disease to the potentialities of the family, because some people are able not only to overcome problems, but also be strengthened by their experiences.

The view of Walsh (2005) is similar. The author describes that addressing family resilience is based on the conviction that even the most distressed families want to be healthy and have the potential for change and growth.

Resilience is a theoretical approach drawn from a concept used in physics and engineering, representing the ability of a system to overcome disorder imposed by an external and unchanged phenomenon. Applied to human life it represents the ability to withstand harsh and persistent conditions, that is, the ability of people, groups or communities not only to withstand adversity, but also to use them in their process of personal development and social growth (Antunes, 2003).

The author adds that all organisms are endowed with some degree of resilience, which can be changed through education; it is possible to instill reliability, security and organizational schemes even in seemingly apathetic people. Thus, it is believed that the family members caring for a person with TBI may be examples of resilient people.

The evaluation of the results of interventions is also of great importance in order to develop a deeper understanding of their effectiveness (Acorn, 1993). This same view is described by Wright & Leahey (2002) when they assert the need to determine the responses of family members to the proposed interventions.

4. Conclusion

Families usually have little or no guidance in how to understand the complex difficulties of TBI. It is believed, therefore, that family support is a valuable intervention to meet the needs of families.

Patients with TBI may feel "lost" after being discharged from the hospital due to a lack of outpatient treatment or rehabilitation, particularly a lack of guidance concerning how to overcome the consequences of trauma.

Trauma must be regarded as a disease rather than an accident or mischance because most deaths and injuries are preventable. Therefore, prevention is the key; it is necessary to educate people to develop awareness of risk behaviors, and especially of individual responsibility and respect for others.

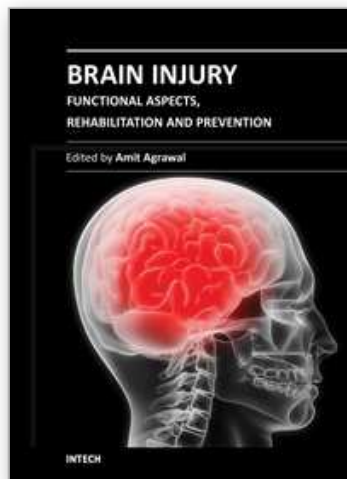
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The present two volume book "Brain Injury" is distinctive in its presentation and includes a wealth of updated information on many aspects in the field of brain injury. The Book is devoted to the pathogenesis of brain injury, concepts in cerebral blood flow and metabolism, investigative approaches and monitoring of brain injured, different protective mechanisms and recovery and management approach to these individuals, functional and endocrine aspects of brain injuries, approaches to rehabilitation of brain injured and preventive aspects of traumatic brain injuries. The collective contribution from experts in brain injury research area would be successfully conveyed to the readers and readers will find this book to be a valuable guide to further develop their understanding about brain injury.

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